

CLAIMS

1. A glass plate manufacturing method for manufacturing
a glass plate by forming molten glass into a sheet using the
5 downdraw method and subjecting the obtained sheet glass to
slow cooling using heat treating unit, wherein a strain
reduction process to reduce strain occurring in the sheet
glass due to the temperature difference between the edge areas
and the surface area in the widthwise direction of the sheet
10 glass is carried out during the slow cooling.

2. The glass plate manufacturing method according to
claim 1, wherein the temperature difference occurs between the
center region of the surface area and the edge areas.

15 3. The glass plate manufacturing method according to
claim 1 or claim 2, wherein the sheet glass subjected to slow
cooling exhibits a widthwise temperature distribution such
that the surface area has a lower temperature than the edge
20 areas.

4. The glass plate manufacturing method according to
any of claims 1 through 3, wherein the strain reduction
processing is carried out based on the strain distribution in
25 the post-molding glass plate measured in advance using the
optical heterodyne method.

5. The glass plate manufacturing method according to
any of claims 1 through 4, wherein the strain reduction

process comprises a heat treatment that forms a prescribed temperature distribution in the widthwise direction of the sheet glass so that the temperature difference in the widthwise direction of the sheet glass after molding is
5 reduced when the sheet glass after molding is subjected to slow cooling by means of the heat treating unit.

6. The glass plate manufacturing method according to claim 5, wherein the heat treatment is carried out at least
10 during a process in which the sheet glass is slowly cooled from the molding temperature to a temperature near the strain point.

7. The sheet glass manufacturing method according to
15 claim 5 or claim 6, wherein the heat treatment is a process in which the temperature distribution that is formed, in the widthwise direction of the sheet glass, by the heat treating unit for heating the sheet glass is set such that the temperature difference in the widthwise direction of the sheet
20 glass may be reduced.

8. The glass plate manufacturing method according to any of claims 1 through 3, wherein the strain reduction process reduces strain occurring from the surface area to the
25 edge areas by increasing the amount of extension of the edge areas relative to the amount of extension of the surface area in accordance with the heat contraction difference occurring between the edge areas and the surface area in the widthwise direction of the sheet glass.

9. A glass plate manufacturing method wherein the maximum strain of the manufactured sheet glass is 0.07 kg/mm^2 or less.

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10. The glass plate manufacturing method according to any of claims 1 through 9, wherein the glass plate is a glass substrate used in a display apparatus.

10 11. A glass plate manufacturing apparatus comprising:
a molding unit that molds molten glass provided
continuously from a molten glass storage tank into a sheet;
drawing unit that draws down the sheet glass molded by
the molding unit and existing in a softened state; and
15 strain reduction unit that reduces the strain caused by
the temperature difference occurring from the edge areas to
the surface area in the widthwise direction of the sheet glass.

20 12. The glass plate manufacturing apparatus according to
claim 11, wherein the strain reduction unit comprises heat
treating unit that slowly cools the sheet glass after molding,
and sets in the widthwise direction of the sheet glass a
temperature distribution that reduces the temperature
difference in the widthwise direction of the post-molding
25 sheet glass.

13. The glass plate manufacturing apparatus according to
claim 11, wherein the strain reduction unit has:

heat treating unit that slowly cools the sheet glass after molding; and

controlling unit that performs control to ensure that the amount of extension of the edge areas is larger than the
5 amount of extension of the surface area in accordance with the temperature difference from the surface area to the edge areas of the sheet glass that is being slowly cooled by the heat treating unit.

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14. A liquid crystal device comprising liquid crystal held between a pair of glass plates formed using the glass plate manufacturing method according to any of claims 1 through 10.